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November 29th.

The President, DR. RUSCHENBERGER, in the Chair.

Thirty-three members present.

The report of the Microscopical and Biological Section for September, October and November was read, and referred to the Publication Committee.

The publication of pages 109 to 124 inclusive, of the Proceedings for 1870 was announced.

The following gentlemen were elected members :

E. Wildman, M. D., David L. Collier, William H. Dougherty, W. H. Wahl, M. D., Chas. Schaffner, M. D., J. Ewing Mears, M. D.

On favorable report of the Committees the following papers were ordered to be printed.

BUD VARIETIES.

BY THOMAS MEEHAN.

A few years ago, Mr. Isaac Burk, of the Academy, called my attention to a form of *Rubus villosus*, L., in which the terminal leaflet was very large, cordate, and on very long petioles. It is a very striking variety, the leaflets appearing at first glance like large linden leaves. He found them in Delaware County. I have since gathered the same form near the intersection in Chester County, near Port Clinton on the Reading Railroad, and along the west bank of the Susquehanna, between Harrisburg and the mouth of the Juniata.

The general forms of *Rubus villosus* are found uniformly in all parts of the State, and, of course, without any break in their appearance between the localities named above. The plant so easily maintains its existence by pieces of roots, and grows as well in sunshine as in shade, in dry and poor as well as in rich and damp places, that it is not easily eradicated when once it obtains possession of the soil. On the idea that varieties originated from one common centre, it is not easy to account for the existence of the same forms so many miles apart, as we find in the above, except by the accidental carrying of seeds.

But I have reason to believe that seeds of *Rubus* rarely germinate in a wild state. In experiments which I have made in raising the seed artificially, none of the seedlings come exactly like the parent. There is a certain general resemblance, but some distinction, more or less, can be traced in each individual. But, in native places, one exact form will be found to occupy extensive tracts. Sometimes several forms will be together, but only a very few. If the seeds made plants readily, there would be innumerable forms, instead of the very few we see. I found, in my experiments, that it took a long time for a blackberry seed to germinate; sometimes a whole year. Such seedlings have a poor chance to vegetate in a state of nature. Other more rapidly-growing vegetation would crowd it out. The only distributing agency I can think of is that of birds. But I find no birds eat blackberry seeds; and, if they did, when we consider that of the millions of seeds which fall about the place of their origin, few, if any grow; the chance of those growing which birds may carry, even if there be some to eat them, which I have failed to find, is extremely small. Hence, we find great difficulty in believing that identical forms of *Rubus*, widely separated, can have originated from a common centre.

Something like this exists in some forms of *Rubus occidentalis*. There is a form with a fruit having soft pulp, of a light purplish red, and comparatively few seeds. This is known amongst botanists, though I do not know that a

[Nov.

description has been published, as *R. neglectus*, Peck. This form is found in isolated places in New York, Northern Pennsylvania, Ohio, and Iowa, and perhaps elsewhere. As in the case of the form of *R. villosus* referred to, there does not seem to be any connection between the localities, as a common centre spreading by roots would imply, while there is the same difficulties in the way of spreading by seeds as in the other. How, then, does this form originate in these widely separated places.

Horticulture may help us to answer this question. It is well known that fruits, after being grown for some time in one locality, will change their characters to such an extent that a person acquainted with one will fail to recognize it elsewhere, and all this without the intervention of any seminal power. Thus, the nectarine is believed to be a bud evolution from a peach; the Penn apple is a similar creation from Baldwin, and the Reading from the common Isabella grape. Though apparently originating in this way from external or local causes, the characters peculiar in this change are retained when, by grafts or cuttings, the plants are removed to other localities. It has also been noted that the pears grown at Rochester, New York, have longer stems than the same varieties grown further south; but I do not know whether this peculiarity, once originated, would follow the grafts or cuttings taken from them. The curled-leaved willow, *Salix babylonica annularis*, was a branch from the common weeping willow, which character it usually retains, though sometimes a branch, resembling the common weeping, will push out from the tree. Of like character is the well-known instance of purple-flowered laburnums sometimes pushing out from the common yellow-flowered one. But perhaps the best known instances are those of the common potato. It is not at all unfrequent to find some of quite another character and color in the same hill. Those who contend for seed agency as the sole originator of varieties will rather believe that there was some other variety of potato accidentally planted with the other than that a new variety sprung from the bud alone. But the evidence of origin from the same original potato-set has, in many instances, been too direct to be doubted; but, even here, rather than admit the doctrine of development through buds, I have heard it *assumed*, by intelligent botanists, that the flowers in such cases *must have been* impregnated with other pollen, and, in *some way*, the descending sap brought about a sort of hybridism or bud change in these tubers. I have also heard excellent and leading botanists (two of them authors of some of our leading works) suggest that many of the varieties of *Rubus* in existence *must be* "hybrids." Of course, this is all assumption, founded on extensive observation, no doubt; but yet on probably no better foundation than my own idea with which I set out in this paper—that often, at least in the cases I have referred to, hybridization is highly improbable.

I have here, however, and exhibit with this paper, evidence of bud variation, in which there is no possibility of hybridism. A root of the common sweet potato, *Convolvulus batatas*, in which some of the tubers are of the red Bermuda, and the others of the white Brazilian variety.

The sweet potato never flowers in this part of the country, so that seminal power could have had no influence whatever on the phenomenon. Even in the south, and I believe elsewhere, where this plant is cultivated for its roots, it rarely flowers, and I think there is little doubt but that the whole ten or twelve varieties under culture have originated without seed, and in the way we see them here.

The points I wish to make in this paper are:—

- 1st. That identical varieties sometimes appear in localities unfavorable to the idea of a common centre of origin.
- 2d. Varieties have originated in which *probably* no hybridism or any seminal agency operated.
- 3d. Varieties have *certainly* originated in the sweet potato by evolution, 1870.]

without seminal agency, and that the same variety in this way has appeared in widely-separated districts.

4th. As the discoveries of Darwin have shown in many cases, varieties to be the parents of species, species may originate in widely-separated localities by bud variation.

A Sketch of the Classification of the American ANSERINÆ.

BY B. H. BANNISTER.

The following remarks are based upon an examination of the specimens of American geese in the collection of the Smithsonian Institution.

The subfamily Anserinæ by many recent authors is made to include the genera *Dendrocygna* and *Chenalopez*, and doubtless correctly. In the present paper, however, we shall not consider these genera, leaving them provisionally out of the subfamily; if included, they would form at least one well marked section, following those we are about to describe.

The distinguishing characters of the Anserinæ, as thus limited to the true geese, are, the lengthened tarsus, covered with hexagonal or subquadrate scales; the neck more elongated than in the ducks and less so than in the swans; the short, high bill gradually narrowing toward the tip, which is altogether composed of the large recurved nail; together with the more or less terrestrial habit of life, and the usually similar plumage of the two sexes.

The geese of the North American continent have been long known, and being for the most part closely allied to, and in many cases identical with, well known European forms, they fall readily into the systematic subdivisions based upon the latter. In the temperate regions of South America, however, the Anserinæ are of a rather aberrant type, and have been less completely studied. They differ chiefly from the North American and European species in possessing metallic tints on the plumage, and in having in two of the genera the coloration of the two sexes widely different. These differences appear to be exclusively regional, none of the aberrant forms being found in North America, and *vice versa*.

Another basis of division of the American Anserinæ is found in the presence, in two species—one North American and the other a Southern form—of deep rough superorbital depressions and reversed relative proportions of the tarsus and middle toe, together with an exclusively sea-coast habitat, and a carnivorous diet, corresponding in some of these respects to the *Oidemiæ* and *Somateriæ* amongst the ducks.

These latter characters we have taken as the basis of the two sections into which we divide the subfamily, as at present considered, since they correspond with equivalent characters in one of the subdivisions of the *Fuliginæ*. The presence of the deep superorbital depressions is a very general character amongst the carnivorous natatores, though not universal.

The following is offered as an outline of the divisions and genera of the subfamily, noting briefly the principal generic characters, the American species and their geographical distribution. The principal characters of the subfamily have been already given at sufficient length.

Subfamily ANSERINÆ.

Section A. *Anseres*. Habits terrestrial; tarsi longer than middle toe with claw, skull without superorbital depressions.

a. *Typical*. Plumage without metallic reflections, color of sexes invariably similar.

1. ANSER, Vieill.

Gen. Char. Bill as short as head or shorter, gaping at the sides, the lamel-
[Nov.